APPENDICES

DRAFT

CALIFORNIA
AQUATIC INVASIVE SPECIES
MANAGEMENT PLAN

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Appendices

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APPENDICES B-D

These appendices provides a detailed description of the primary federal and state laws, regulations and public policies that empower and direct different government agencies to manage AIS in the state of California. They also describe the primary activities of all the government agencies – state, federal and regional – involved in AIS management, as well as most of the major committees and boards set up to coordinate and oversee such activities. These details are provided to support and expand on the information contained in the Management Framework provided in Chapter V of this plan (as such there is some repetition of information). While these appendices attempt to be comprehensive, they lack the space to present every single AIS program, law or activity in the state and nation. Through the web links provided below and further information in the appendices, however, more details on what is presented here should be easily available to all interested parties. *Note: Some laws and policies refer to ANS, aquatic nuisance species, rather than AIS, aquatic invasive species.*

APPENDIX B: FEDERAL AUTHORITIES, LEGISLATION & AGENCIES

FEDERAL AUTHORITIES

No single federal agency has comprehensive authority for all aspects of aquatic invasive species management. Federal agencies with regulatory authority over the introduction and transport of aquatic species that may be invasive or noxious include the U.S. Department of Agriculture Animal Plant Health Inspection Service, the U.S. Department of Agriculture Agricultural Marketing Service, the U.S. Fish and Wildlife Service, the U.S. Department of Commerce, and the U.S. Coast Guard. But many other agencies have programs and responsibilities that address components of AIS, such as importation, interstate transport, exclusion, control, and eradication.

The primary federal authorities for managing and regulating AIS derive from the National Environmental Policy Act, the Nonindigenous Aquatic Nuisance Prevention and Control Act (NANPCA, 1990), the National Invasive Species Act (NISA, 1996), the Lacey Act, the Plant Pest Act, the Federal Noxious Weed Act, and the Endangered Species Act. An Executive Order signed by President William J. Clinton on February 3, 1999 expanded federal efforts to address AIS. The order created a National Invasive Species Council charged with developing a comprehensive plan to minimize the economic, ecological, and human health impacts of invasive species.

Brief descriptions of the President's Executive Order, NANPCA and NISA are provided below, followed by an explanation of how federal activities are now coordinated through the National Aquatic Nuisance Species Task Force and the National Invasive Species Council, and by descriptions of some of the earlier acts and laws still enforced in AIS management.

Primary Federal AIS Authorities

1990 - Nonindigenous Aquatic Nuisance Prevention and Control Act
(NANPCA; Title I of P. No.101-646, 16 U.S.C. 4701 et seq.)
http://www.anstaskforce.gov/default.php

The Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) established a federal program to prevent the introduction and control the spread of introduced aquatic nuisance species and the brown tree snake. NANPCA serves as a first line of defense against aquatic nuisance invasions. The act provides an institutional framework that promotes and coordinates research, develops and applies prevention and control strategies, establishes national priorities, educates and informs citizens, and coordinates public programs. The act calls upon states to develop and implement comprehensive state management plans to prevent introduction and control the spread of ANS. Section 1002 of NANPCA outlines five objectives of the law, as follows:

- Prevent further unintentional introductions of nonindigenous aquatic species;
- Coordinate federally funded research, control efforts, and information dissemination;
- Develop and carry out environmentally sound control methods to prevent, monitor, and control unintentional introductions;
- Understand and minimize economic and ecological damage; and
- Establish a program of research and technology development to assist state governments.

Section 1201 of the act established the national Aquatic Nuisance Species Task Force, co-chaired by the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration. The Task Force is charged with coordinating governmental efforts related to ANS prevention and control. The ANS Task Force consists of 10 federal agency representatives and 12 ex officio members representing nonfederal governmental agencies (see Other AIS Interests, Appendix D).

1996 -- National Invasive Species Act
(NISA; P. No.104-332)

In 1996, the National Invasive Species Act (NISA) amended the NANPCA of 1990 to mandate ballast water exchange for vessels entering the Great Lakes and to implement voluntary ballast water exchange guidelines for all vessels with ballast on board that enter U.S. waters from outside the Exclusive Economic Zone (EEZ). Though the act did not make exchange mandatory, it did require all vessels to submit a report form to the U.S. Coast Guard documenting specific ballast water management practices. It also authorized the Coast Guard to toughen requirements if compliance proved unsatisfactory, which it did in 2004 (see below). NISA authorized funding for research on aquatic nuisance species prevention and control in Chesapeake Bay, the Gulf of Mexico, the Pacific coast, the Atlantic coast, and the San Francisco Bay-Delta Estuary. In addition, NISA required a ballast water management program to demonstrate technologies and practices to prevent aquatic non-indigenous species from being introduced into and spread through ballast water in U.S. waters. It modified both the composition and research priorities of the Aquatic Nuisance Species Task Force and requirements for the zebra mussel demonstration program.

1999 - Executive Order 13112
(64 Fed. Reg. 6183)
http://www.invasivespeciesinfo.gov/council/main.shtml

President William J. Clinton signed Executive Order 13112 on Invasive Species on February 3, 1999. The order seeks to prevent the introduction of invasive species, provide for their control, and minimize their impacts through improved coordination of federal agency efforts

under a National Invasive Species Management Plan to be developed by the newly created interagency National Invasive Species Council (NISC). The Council has three co-chairs: the secretaries of Agriculture, Commerce, and the Interior. Members also include the secretaries of State, Defense, Homeland Security, Treasury, Transportation, and Health and Human Services, as well as the administrators of U.S. EPA, the U.S. Agency for International Development, the U.S Trade Representative, and the National Aeronautics and Space Administration.

The order directs all federal agencies to address invasive species concerns, as well as to refrain from actions likely to increase invasive species problems. The Council actively works with the Invasive Species Advisory Committee (ISAC), also established under the order. The ISAC was established to advise the federal government on the issue of invasive species and to act as representatives of the many stakeholders. The Council released the first National Management Plan in 2001. The Plan serves as a blueprint for all federal action on invasive species. The Council is currently working to establish federal and non-federal task teams to implement the plan's action items.

Federal activities are now coordinated through NISC (established by the executive order) and the ANS Task Force (established by NANCPA 90 and NISA 96). To help coordinate these two groups, the Department of Commerce (DOC) Policy Liaison to NISC also serves as the DOC representative to the ANS Task Force. In addition, NISC and the ANS Task Force have formed joint working groups on each of the following topics: pathways, risk analysis and screening.

The task force and the species council are similar in that they perform coordinating functions but different in their responsibilities: NISC focuses on all invasive species while the ANS Task Force focuses on aquatic invasive species. Although many of the same principles apply to managing aquatic and terrestrial invasive species, many management issues are unique to the aquatic environment and need to be addressed separately.

1993-2005 Coast Guard Regulations Under NISA
(33 CFR 151)

The U.S. Coast Guard has promulgated a number of ballast water management regulations based on the authority given to it by NANPCA in 1990 and NISA in 1996. As directed by NANPCA, the Coast Guard implemented regulations requiring vessels entering the Great Lakes and the Hudson River, after operating outside the U.S. Exclusive Economic Zone (EEZ), to conduct ballast water management. This mandatory regime was implemented beginning in 1993 and continues today.

To comply with the National Invasive Species Act of 1996 (NISA), the Coast Guard established regulations and guidelines to control the introduction of ANS via ballast water discharges in U.S. waters other than the Great Lakes. Compliance with the resulting *voluntary* ballast management and mandatory reporting program was only 30%, according to a 2002 Report to Congress. Therefore, under the authority of NISA, the Coast Guard has since established *mandatory* ballast water management requirements and penalties for non-compliance. The mandatory program requires ships to use one of three ballast water management methods: 1) retaining ballast water on board, 2) conducting a mid-ocean exchange, and/or 3) using an approved ballast water treatment method. All vessels are required to submit ballast water management reports (failure to submit a report can now result in penalties). These mandatory regulations came into effect on 27 September 2004. Federal regulations also require vessels to maintain a ballast water management plan that is specific for that vessel and assigns responsibility to the master or appropriate official to understand and execute the ballast water management strategy for that vessel.

Under NANPCA/NISA, states are specifically permitted to regulate ballast water on ships. Several states have elected to do so to various degrees. In addition to reporting requirements, California, Oregon and Washington have ballast water exchange requirements and California has

a law that requires the state to issue a ballast water discharge standard in 2007 (see California Authorities section). See Appendix B for more details on state and federal ballast water management requirements.

Other Federal Authorities

Animal Damage Control Act (1931)
AIS Implementing Agencies: USDA
http://www.aphis.usda.gov/

Under the Animal Damage Control Act, the U.S. Department of Agriculture, Animal and Plant Health Inspection Service has authority to control wildlife damage on federal, state, or private land, including damage from invasive species. The act protects field crops, vegetables, fruits, nuts, horticultural crops, and commercial forests; freshwater aquaculture ponds and marine species cultivation areas; livestock on public and private range and in feedlots; public and private buildings and facilities; civilian and military aircraft; and public health.

Animal Health Protection Act
(2002; 7 U.S.C. 8301, et seq.)
AIS Implementing Agencies: USDA
http://www.aphis.usda.gov/

The Animal Health Protection Act (AHPA) provides a flexible statutory framework for protecting domestic livestock from foreign pests and diseases. This act authorizes the USDA to promulgate regulations and take measures to prevent the introduction and dissemination of pests and diseases of livestock. The scope of such regulatory authority extends to the movement of all members of the animal kingdom, domestic and wild, except humans. The fact that a pest or disease primarily affects animals other than livestock, including humans, does not limit USDA's authority to regulate a species, so long as it carries a pest or disease of livestock. Further, the act defines "livestock" to mean all farm-raised animals, clarifying the USDA's authority to conduct animal health protection activities in connection with farm-raised aquatic animals.

Clean Water Act
AIS Implementing Agencies: USEPA, USACE, SWRCB, RWQCB
http://www.epa.gov/r5water/cwa.htm
http://unds.bah.com/default.htm

Various sections of the Clean Water Act regulate discharges of pollutants (such as AIS and ballast water) and fill material to waters of the United States. Section 402 of the act authorizes the National Pollutant Discharge Elimination System (NPDES), a permit program intended to reduce and eliminate the discharge of pollutants from point sources that threaten to impair beneficial uses of water bodies. The act defines point sources to include vessels (Section 502(14)) and prohibits all point source discharges of pollutants into U.S. waters unless a permit has been issued either under Section 402 (NPDES) or Section 404 (dredge and fill activities).

California's Waste Discharge Requirements incorporate the authority of the federal NPDES permitting program for discharges of wastes to surface waters. Section 303(d) of the act requires implementing agencies to establish and allocate "a total maximum daily load (TMDL) for those pollutants which the (EPA) Administrator identifies under Section 304(a)(2) as suitable for such calculation." This section of the CWA was developed to support a water quality-based system of effluent limits for chemical pollutants; the interpretation of what an allowable load of invasive species is has not been defined.

Under Section 305(b) of the CWA, California's nine Regional Water Quality Control Boards are required to assess water bodies for attainment of beneficial uses every two years and report to the U.S. EPA. In cases where beneficial uses of water bodies are shown to be impaired,

Section 303(d) requires the Regional Boards to list the impaired water bodies and "establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters." Section 502(6) defines "pollutant" as dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, *biological materials,* radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water. Ballast water is considered to be a pollutant in discharges based on the above definition and definitions in the State Water Code.

Endangered Species Act of 1973
(ESA; 16 U.S.C.A. §§ 1531 to 1544)
AIS Implementing Agencies: NOAA, NMFS, USFWS
http://www.fws.gov/endangered/

The ESA aims to protect endangered and threatened species. When nonnative invasive species threaten endangered species, this act could be used as basis for their eradication or control by the Department of Interior (USFWS) or by the Department of Commerce (NOAA & NMFS). The potential to harm a federally-listed species and the need to obtain a permit from the USFWS or NMFS should be taken into consideration when selecting methods to manage AIS.

Lacey Act (1900; amended 1998)
AIS Implementing Agencies: USFWS
http://www.fws.gov/laws/lawsdigest/lacey.html

As the first federal act that tried to control migrations and importations of non-indigenous species, the Lacey Act prohibits the importation of a list of designated species and other vertebrates, mollusks, and crustacea that are "injurious to human beings, to the interests of agriculture, horticulture, forestry, or to wildlife or the wildlife resources of the United States." The Lacey Act declares importation or transportation of any live wildlife as injurious and prohibited, except as provided for under the act, but allows for the import of almost all species for scientific, medical, education, exhibition, or propagation purposes. The U.S. Fish and Wildlife Service is the lead agency for enforcing the Lacey Act's prohibition of fish and wildlife imports.

National Environmental Policy Act of 1970
(NEPA; 42 U.S.C.A. §§ 4321 to 4370e)
AIS Implementing Agencies: All Federal Agencies
http://www.epa.gov/compliance/nepa/index.html

NEPA requires the consideration of environmental impacts for any federal action, including direct federal activities, permitting, and federal funding of activities by another entity. NEPA environmental documents may include a "finding of no significant impact (FONSI)," an "environmental assessment (EA)," or a full "environmental impact statement (EIS)." Potential impacts of invasive species, both direct and indirect, may be among the issues that should be considered under NEPA.

Noxious Weed Act
(1974; 7 U.S.C. § 360)
AIS Implementing Agencies: USDA

Section 15 of the Federal Noxious Weed Act requires federal land management agencies to develop and establish a management program for control of undesirable plants that are classified under state or federal law as undesirable, noxious, harmful, injurious, or poisonous, on federal lands under the agency's jurisdiction (7 U.S.C. 2814(a)). The act also requires the federal land management agencies to enter into cooperative agreements to coordinate the management of undesirable plant species on federal lands where similar programs are being implemented on state and private lands in the same area (7 U.S.C. 2814(c)). The Secretaries of Agriculture and

the Interior must coordinate their respective control, research, and educational efforts relating to noxious weeds (7 U.S.C. 2814(f)). USDA's Departmental Regulation 9500-10 sets forth departmental policy relating to the management and coordination of noxious weeds activities among the agencies within USDA and other entities.

Plant Protection Act
(2000; 7 U.S.C. 7701 *et seq*.)
AIS Implementing Agencies: USDA
http://www.aphis.usda.gov/

The Plant Protection Act (PPA) authorizes the USDA to prohibit or restrict the importation or interstate movement of any plant, plant product, biological control organism, noxious weed, article, or means of conveyance if the Secretary of Agriculture determines that the prohibition or restriction is necessary to prevent the introduction into the United States, or the dissemination within the United States, of a plant pest or noxious weed.

The PPA specifically authorizes USDA to develop integrated management plans for noxious weeds for the geographic region or ecological range where the noxious weed is found in the United States. In addition, the act authorizes the USDA to cooperate with other federal agencies or entities, states or political subdivisions of states, national governments, local governments of other nations, domestic or international organizations, domestic or international associations, and other persons to carry out the provisions of the act.

FEDERAL AGENCIES

Numerous federal agencies, presented here in alphabetical order, have authority to implement the laws and policies described above. Other federal agencies have mandates impacted by AIS and thus engage in research, monitoring, prevention or control programs. Still others delegate primary responsibility for implementation to state and regional agencies (see next section). The following descriptions attempt to provide a general introduction to the scope of each agency's work, as well as a brief review of the agency's recent (as of 2006) major AIS-related activities.

Bureau of Reclamation
http://www.usbr.gov/

The Bureau of Reclamation is involved in several important projects related to this issue. The Bureau has partnered with the DFG, USFWS, and others to investigate the mitten crab infestation in the Sacramento-San Joaquin Delta. The agency participates in the Giant Salvinia Task Force's efforts to limit the spread of *Salvinia molesta* in the Colorado River (see Appendix D), has a detection program for water hyacinth and participates in activities related to the New Zealand mudsnail infestation in Putah Creek. The agency also participated in DFA's Hydrilla Eradication Program.

National Oceanic and Atmospheric Administration (NOAA)
http://www.noaa.gov/

NOAA is the primary federal agency charge with management of marine resources. NOAA is the co-chair of the Aquatic Nuisance Species Task Force and has been designated the Department of Commerce lead as co-chair of the National Invasive Species Council. Within NOAA, a number of national, state and regional agencies and programs are actively involved in AIS issues in California. These include: NOAA's National Estuarine Research Reserve System, a network of protected areas established for long-term research, education, and stewardship; NOAA's National Marine Fisheries Service, which works to protect fisheries habitat, commercial fisheries, and endangered fish; NOAA's National Marine Sanctuaries, which serve as the trustee for the nation's system of marine protected areas and seek to conserve, protect, and enhance

their biodiversity, ecological integrity, and cultural legacy; and NOAA's Sea Grant, a nationwide network of 30 university-based programs that work with coastal communities and conduct scientific research and education projects designed to foster science-based decisions about the use and conservation of U.S. aquatic resources.

National Estuarine Research Reserve System (NOAA – NERR)
http://nerrs.noaa.gov/
http://sfbaynerr.org
http://www.elkhornslough.org/
http://nerrs.noaa.gov/TijuanaRiver/

There are three reserves in California. The San Francisco Bay reserve protects two large, relatively pristine, tidal wetlands: China Camp State Park in Marin County and Rush Ranch Open Space in Solano County. These sites are currently part of an AIS early detection and assessment study, and the creation of detailed vegetation maps to serve as a baseline to evaluate future invasions. China Camp serves as an uninvaded reference site for marshes invaded by Spartina hybrids in San Francisco Bay, and Rush Ranch is a site of active research on invasive fish and invertebrates. The Elkhorn Slough reserve protects approximately 1,400 acres, including Elkhorn Slough, one of the few coastal wetlands remaining in California. Elkhorn estuarine habitats have over 60 species of non-native inverts, over 20 species of non-native plants, and a few non-native fish and algae. All of these are currently widespread, so eradication seems impossible. Thus, efforts are focusing on early detection and eradication of new "least wanted" invaders such as mitten crabs and Caulerpa. The reserve launched an early detection program for aquatic alien invaders in 2002. The Tijuana River reserve's 2,500 acres encompass beach, dune, mudflat, saltmarsh, riparian, coastal sage, and upland habitats surrounded by the growing cities of Tijuana, Imperial Beach, and San Diego. Critical invasive species issues include: tamarisk, iceplant, and other exotic plants displacing native species in the salt marsh and upland habitats; ongoing surveys to understand the dynamics of aquatic NIS; and efforts to understand ecosystem recovery following eradication of invasives. All three reserves in California provide a platform to increase communication between scientists, decision-makers, land managers, and the public in order to better deal with AIS issues.

National Marine Fisheries Service (NMFS)
http://www.nmfs.noaa.gov/

NMFS is in charge sustaining the nation's fisheries, many of which are being directly impacted by AIS, and is involved in many AIS projects in California. NMFS has a key role on the Southern California *Caulerpa* Action Team (eradication of *Caulerpa taxifolia*). NMFS is also involved with a variety of other collaborative research projects including: ballast water exchange and risk evaluation research and hull fouling research funded by the Port of Oakland; analysis of biofouling communities and community effects; and surveys and experimental treatments of several invasive species, including *Littorina littorea*, an exotic snail, and *Ascophyllum nodosum*, a brown alga, in San Francisco Bay. NMFS also participates on several AIS advisory and coordinating committees including: the Pacific Ballast Workgroup, Non-native Invasive Species Advisory Council, and Ballast Outreach Advisory Team.

National Marine Sanctuaries (NOAA – NMS)
http://sanctuaries.noaa.gov/

California has four sanctuaries – Channel Islands NMS, Cordell Banks NMS, Gulf of Farallones NMS and Monterey Bay NMS. The latter two sanctuaries are in the process of developing aquatic invasive species management plans and have conducted monitoring programs for AIS.

National Sea Grant (NOAA – Sea Grant)
http://www.seagrant.noaa.gov/
http://www-csgc.ucsd.edu
http://ballast-outreach-ucsgep.ucdavis.edu/

The National Sea Grant Program is a partnership between the nation's universities and NOAA (under the Office of Oceanic and Atmospheric Research) that began in 1966. The California Sea Grant program is the largest of these programs. Sea Grant began the West Coast Ballast Outreach Project in 1999 (co-sponsored by the CALFED Bay-Delta Program) to address concerns that ballast water discharges could be introducing foreign marine species into the state's coastal and estuarine ecosystems. The project educates the maritime industry about the ecological seriousness of aquatic exotic species by publishing the newsletter "Ballast Exchange," maintaining an educational Web site, coordinating workshops. Sea Grant funding has supported a wide variety of research projects on key invasive species, such as the Chinese mitten crab, European green crab, the exotic Australian isopod, *Sphaeroma quoyanum*, the invasive seaweed, *Undaria pinnatifida*, and invasive *Spartina* hybrids. CSG-sponsored research led to the eradication of the South African sabellid worm (*Terebrasabella heterouncinata*) at the site near Cayucos, California, where it has become established.

National Park Service
www.nps.gov

NPS preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country. The NPS has several invasive species monitoring, control, research and eradication programs in California, all of which should be coordinated to aid early detection and control projects in cooperation with the California state aquatic invasive species plan. Eradication and control are supported by two programs. The first is the (California) Exotic Plant Management Team (EPMT), which travels around the state to national parks that have requested assistance in removal and control projects. The EPMT has traditionally focused on terrestrial non-natives, but could be asked to consider aquatic invaders. Through the second program, individual parks can request funds from Washington or the NPS Western Region for control and eradication projects. Natural resource inventories and monitoring activities occur in all California National Parks and these programs are well poised to alert managers to emerging and growing threats from invasive species. Information from these programs should be shared among the California AIS plan partners. Finally, the NPS actively supports and hosts research projects on impacts of invasive species on ecological communities. National Parks included in the EPMT, inventories, monitoring and research encompass about 2.4 million acres in California and hundreds of miles of coastline. Significant education and outreach occurs at all of these sites.

U.S. Army Corps of Engineers (COE)
http://www.usace.army.mil/

The Corps provides engineering, construction, and environmental project services for the military and local governments. Congress authorizes the Corps to assist local governments with water resource development needs, which include flood control, navigation, ecosystem restoration, and watershed planning. For ecosystem restoration, this includes research on invasive species. Specific programs addressing invasive species issues include the Aquatic Nuisance Species Research Program, the Aquatic Plant Control Research Program, and the Water Operations Technical Support Program. COE is also responsible for permitting aquaculture projects, including oyster farms, which often involves AIS considerations.

U.S. Coast Guard (USCG)
http://www.uscg.mil/hq/g-m/mso/bwm.htm
http://www.uscg.mil/hq/g-m/PSO/bwm.htm

The Coast Guard has established a mandatory program aimed at keeping aquatic nuisance species out of U.S. waters using ballast water management methods. Since then, Coast Guard activities have focused on enforcement and monitoring to ensure compliance with the program, and include regular on-board inspections and coordination with California's State Lands Commission, which manages the state's ballast water program. In 2004, the Coast Guard issued "Ballast Water Management for the Control of Aquatic Nuisance Species in the Waters of the United States," a guidance document concerning ballast water management

Coast Guard activities related to AIS are diverse. The agency is working on the development of chemical and engineering methods to verify that a mid-ocean exchange has occurred. It is also evaluating technologies for the treatment of ballast water. The Coast Guard has determined that due to difficulties in establishing the effectiveness of ballast water exchange as it varies across ship types, voyages and from tank to tank, treatment technologies are best evaluated through a ballast water discharge standard (a benchmark for maximum numbers of organisms that may be discharged in ballast water). Such a standard will not only be helpful in evaluating the effectiveness of treatment technologies, but also clearly establish when the ballast water no longer contains quantities of organisms that pose a significant risk (California law requires it to develop its own standard by 2006). A Programmatic Environmental Impact Statement, detailing the evaluation of environmental impacts to the U.S. by several potential ballast water discharge standard alternatives, is currently in development.

The Coast Guard has also initiated several projects designed to provide information on the state of development of treatment technologies and the basic characteristics of treatment processes. These efforts have included scientific audits that tested and evaluated three approaches: filtration, ultraviolet light and hydrocyclonic separation. In addition, the Coast Guard developed and launched the Shipboard Technology Evaluation Program (STEP) in 2004 to encourage ship owners and operators to participate in evaluating technologies for shipboard application. This program allows for the review of experimental plans and treatment technology installations aboard ships and, provided they perform largely as designed and show promise for reducing the risk of introductions, treatment technology installations will be granted an equivalency with regulations for ballast water management and the Ballast Water Discharge Standard.

U.S. Department of Agriculture
http://www.aphis.usda.gov/
http://www.ars.usda.gov/main/main.htm
http://www.invasivespeciesinfo.gov

USDA provides leadership on food, agriculture, natural resources, and related issues. USDA conducts a number of programs and activities related to invasive species. Its Animal and Plant Health Inspection Service's (APHIS) is not only dealing with invaders like the South American wetland rodent nutria in the Mississippi Delta region, but has also worked on other invasive animal, fish and crab problems around the country. APHIS has done extensive noxious weed work, including exclusion, permitting, eradication of incipient infestations, surveys, data management, public education, and (in cooperation with other agencies and state agencies) integrated management of introduced weeds, including biological control. Aquatic weeds are included in the federal noxious weed list through the APHIS Cooperative Agricultural Pest Survey (CAPS).

The USDA's Agricultural Research Service (ARS) has three Exotic and Invasive Weed Research (EIWR) units in the west: at Davis and Albany, California, and at Reno, Nevada.

Scientists at these facilities are responsible for research, the transfer of technology for improvement of management and control, and eradication of invasive aquatic and riparian weeds affecting agriculture and natural resources. These projects address three current ARS program priorities: 1) the reduction of dependence on pesticide use (specifically herbicides); 2) the President's 1999 Executive Order on Invasive Species; and 3) water-quality improvement.

Research is conducted on the biology, reproduction, ecology, management, or eradication of several important invasive aquatic weeds, including *Hydrilla verticillata*, *Egeria densa*, *Eichhornia crassipes*, *Spartina alterniflora*, *Myriophyllum spicatum*, *Myriophyllum aquaticum*, *Ludwigia peploides*, *Caulerpa taxifolia, Arundo donax*, *Tamarix spp*., *Lepidium latifolium*, and other native invasive species. The program also provides technology transfer for the eradication of *H. verticillata* and *C. taxifolia*; and management of *E. densa* and *E. crassipes*. The EIWR units are also involved in aquatic and riparian weed education for public, state, and federal stakeholders.

U.S. Environmental Protection Agency
http://www.epa.gov/owow/invasive_species

USEPA leads the nation's environmental science, research, education and assessment efforts. It develops and enforces regulations, offers financial assistance, performs environmental research, sponsors voluntary partnerships and programs, furthers environmental education, and publishes information. USEPA is responsible for enforcing the Clean Water Act (CWA). USEPA released its *EPA Authorities for Natural Resource Managers Developing Aquatic Invasive Species Rapid Response and Management Plans* in December 2005. This document provides an overview of EPA authorities that might apply to state or local AIS rapid response and control actions. The document summarizes relevant sections of the CWA and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA); summarizes how to apply for CWA Section 404 permits to discharge dredged or fill material; summarizes how to apply for FIFRA Section 18 emergency exemptions and FIFRA Section 24(c) special local need registrations; and describes case studies in which state and local natural resource managers successfully obtained FIFRA emergency exemptions and special local need registrations for AIS eradication or control actions.

Within USEPA, there are three members of the National Estuary Program in California whose activities encompass AIS management.

National Estuary Program
http://www.epa.gov/nep
SF: http://www.abag.org/bayarea/sfep/sfep.html
Morro: http://www.mbnep.org/index.php
SM: http://www.santamonicabay.org/

Congress established the U.S. EPA's National Estuary Program in 1987 to protect and improve the water quality and natural resources of estuaries nationwide. There are three programs in California. The San Francisco Estuary Project (SFEP) was formed in 1987 as a cooperative federal/state/local program to promote effective management of the San Francisco Bay-Delta Estuary, and created a consensus-based management plan for the Estuary including concrete actions related to invasive species. More recently, SFEP identified invasive species as the number-one priority issue in estuary restoration. SFEP holds an ex officio seat on the ANS Task Force, and is a member of the Western Regional Panel.

The Morro Bay Estuary joined the National Estuary Program in July 1995. The estuary contains the most significant wetland system along California's south-central coast. It supports many species of internationally-protected migratory birds, offers rare wetland habitat to a number of threatened native plant and animal species, and provides a protected harbor for marine fisheries. There are plans to suppress or eliminate at least

two aquatic invasive species present in the estuary: giant cane (*Arundo donax*), and Sacramento pikeminnow (*Ptychocheilus grandis*). Efforts to eliminate a pioneer population of giant cane growing along Chorro Creek, a major estuary waterway, and its tributaries, are ongoing; eradication is expected by 2008. Efforts to suppress the pikeminnow to the point where native steelhead populations can begin recovery are expected to begin in 2007.

The Santa Monica Bay Estuary Program was established in 1988 to ensure the long-term health of the 266-square-mile Santa Monica Bay and its 400-square-mile watershed. In 2003, this project became an independent state organization, the Santa Monica Bay Restoration Commission. In terms of invasives, the commission has focused most recently on coastal bluff, wetland and riparian vegetation, funding extensive removal and replanting programs as well as outreach on "California friendly" gardens. The newest threat seems to be the arrival of the New Zealand mud snail in some Santa Monica mountains streams. The commission is convening experts to strategize how to slow the snail's spread.

U.S. Fish and Wildlife Service (USFWS)
http://www.fws.gov/
http://www.100thmeridian.org

USFWS has multiple programs that address AIS management. USFWS serves as co-chair of the Federal ANS Task Force, and is the agency that provides federal funding for the implementation of State AIS management plans that the Task Force has approved. USFWS also provides technical assistance to states regarding AIS management. USFWS administers the Lacey Act, which prohibits importation and interstate delivery of listed species. USFWS prevention programs include the 100th Meridian Initiative (see Appendix D, Species-Specific Initiatives), which focuses on preventing the western spread of zebra mussels. In cooperation with the ANS Task Force, the USFWS has developed planning documents for mitten crab, green crab, and *Caulerpa.* USFWS refuges support invasive species control programs as part of their overall habitat restoration activities.

U.S. Geological Survey (USGS)
http://www.usgs.gov
http://nas.er.usgs.gov/

USGS acknowledged its role in nonnative species management in a White Paper on Invasive Species, which identifies the goal of developing new strategies for the prevention, early detection, and prompt eradication of new invaders. The USGS further identifies information management and documentation of invasions as a priority for the agency. In keeping with this objective, the USGS developed and maintains an extensive, spatially referenced database of nonnative species, which is accessible online.

APPENDIX C: STATE AUTHORITIES, LEGISLATION & AGENCIES

In California, many state agencies have authority over and regulatory roles for managing natural resources (summarized in Chapter IV). While diverse agencies have some authority to regulate AIS, no centralized authority or management structure exists to coordinate AIS activities. The legal frameworks that apply to control of aquatic invasive species introductions are broad and varied. This section describes the existing authorities that various state agencies and entities have for managing AIS in California.

CALIFORNIA AUTHORITIES

California Environmental Quality Act (CEQA)
(CA Public Resources Code §§ 21000 et seq.)
http://ceres.ca.gov/ceqa/

The California Environmental Quality Act (CEQA) requires public disclosure of all significant environmental effects of proposed discretionary projects. If a project would cause significant effects, final documents in the CEQA process show 1) what mitigation measures will be required to reduce particular effects to a less significant level, and 2) provide justifications for the approval of the project with particular significant effects left unmitigated (i.e. a finding of overriding consideration). CEQA also contains lists of project types exempt from this process. A "significant" impact is a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, [and] fauna . . ." The documented adverse impacts associated with invasive species can fit this broad definition.

California Porter-Cologne Water Quality Control Act
(CA Water Code §§ 1300 et seq.)
http://ceres.ca.gov/

Under California's Porter-Cologne Water Quality Control Act, "any person discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the state" must file a report of the discharge with the appropriate Regional Water Quality Control Board. Pursuant to the act, the Regional Board then prescribes "waste discharge requirements" related to control of the discharge. The act defines "waste" broadly, and the term has been applied to a diverse array of materials. The San Francisco Bay Regional Water Quality Control Board, for example, has determined that "ballast water and hull fouling discharges cause pollution as defined under the Porter-Cologne Water Quality Control Act."

The act (California Water Code, Division 7), lists a number of types of pollutants that are subject to regulation by the SWRCB. Section 13050, for example, specifically includes the regulation of "biological" pollutants by defining them as relevant characteristics of water quality subject to regulation by the Board: AIS are an example of this kind of pollutant if they are discharged to receiving waters. Several of the Regional Boards have taken legal policy and enforcement actions related to AIS (see also CWA, Appendix B, and SWRCB, California Agencies).

Fish and Game Code and Title 14 of the California Code of Regulations
AIS Implementing Agencies: DFG, DFA
http://www.fgc.ca.gov/html/regs.html
http://www.dfg.ca.gov/ospr/organizational/scientific/exotic/exotic%20report.htm

The Fish and Game Code consists of the laws passed by the State legislature that pertain to fish and wildlife resources. Under statutes in the Fish and Game Code, the California

Fish and Game Commission has the responsibility for the adoption of regulations that provide details on how certain Fish and Game laws are to be implemented. These regulations are published in Title 14 of the California Code of Regulations. A summary is provided below of Fish and Game Code Sections that address invasive species issues or may relate to control actions.

F& G Code §§ 2080 – 2089 DFG regulates the take of species listed under the California Endangered Species Act. In addition to the instructions in the Fish and Game Code, guidelines for this process are located in Title 14, Division 1, Subdivision 3, Chapter 6, Article 1 of the California Code of Regulations. These statutes and regulations should be consulted if AIS control measures have the potential to impact State-listed species.

F & G Code §§ 2118, 2270-2272: DFG is responsible for enforcement of importation, transportation, and sheltering of restricted live wild animals; places importation restrictions on aquatic plants and animals; and prohibits nine species of *Caulerpa*.

F & G Code §§6400-6403: It is unlawful to place live fish, fresh or saltwater animals or aquatic plants in any waters of this State without a permit from DFG.

F & G Code §§ 6430-6433: DFG is responsible for prescribed studies for ballast water-related invasive species and has prepared a baseline report of species present in California entitled "A Survey of Non-Indigenous Aquatic Species in the Coastal and Estuarine Water of California" (see online address above).

F & G Code §§15000 et seq.: DFG is responsible for regulations pertaining to the aquaculture industry, including disease issues.

Harbors & Navigation Code
AIS Implementing Agencies: DBW

The Harbors & Navigation Code, Article 2, Section 64, authorizes DBW to manage aquatic weeds affecting the navigation and use of the State's waterways.

Ballast Management for Control of Nonindigenous Species Act (AB 703)
AIS Implementing Agencies: SLC, DFG, SWRCB, BOE
1999

This act charged the California State Lands Commission (SLC) with oversight of the state's first program to prevent non-indigenous species (NIS) introductions through the ballast water of commercial vessels of over 3000 GRT in size. The 1999 act required that vessels originating from outside the United States Economic Exclusive Zone (EEZ) carry out mid-ocean exchange or use an approved ballast water treatment method, before discharging in California state waters. SLC was tasked with: receiving and processing ballast management reports from all such vessels, monitoring ballast management and discharge activities of vessels through submitted reports, inspecting vessels for compliance, and assessing vessel reporting rates and compliance. The activities and analyses of the first few years of the program are detailed in the 2003 biennial report of the California Ballast Water Management Program. Upon the sunset of the Act, the Marine Invasive Species Act (AB 433) was passed in 2003, revising and widening the scope of the program to more effectively address the NIS threat (see below).

Marine Invasive Species Act (AB 433)
(Public Resources Code Section 71200-71271;
Title 2, California Code of Regulations, Section 2271)
AIS Implementing Agencies: SLC, DFG*, SWRCB, BOE*
http://www.slc.ca.gov/Division_Pages/MFD/MFD_Programs/Ballast_Water/Ballast_Water_Default.htm

The Marine Invasive Species Act, passed in 2003, revises and recasts the state's law (AB 703) pertaining to control of non-indigenous species and ballast water management. It imposes additional requirements upon vessel masters, owners, operators, and persons in charge of vessels to prevent the introduction of non-indigenous species into waters of the state or waters that may impact the waters of the state. The bill deletes exemptions for specified vessels from compliance with the act and revises the qualification for the vessels subject to the act.

Ballast water management is required of all vessels that intend to discharge ballast water in California waters, though the regulations differ depending on voyage origin. All qualifying vessels coming from ports within the Pacific Coast region must conduct near-coast exchange (in waters at least 50 nautical miles offshore, and 200 meters deep), or retain all ballast water and associated sediments. There are exceptions that address safety concerns, and for vessels that transit wholly within defined shared waters (San Francisco/-Stockton/Sacramento Delta, and Los Angeles/Long Beach/El Segundo Complex).

All vessels must complete and submit a ballast water report form upon departure from each port of call in California. They must also comply with the good housekeeping practices, ranging from avoiding discharge near marine sanctuaries to rinsing anchors and removing fouling organisms from the hull.

They must maintain a ballast water management plan prepared specifically for the vessel; keep a ballast water log outlining ballast water management activities for each ballast water tank on board the vessel, and make the separate ballast water log available for inspection; conduct training of vessel master, PIC, and crew regarding the application of ballast water and sediment management and treatment procedures; and pay a fee for each qualifying voyage at their first port of call in California.

To determine the effectiveness of the management provisions of the act, the legislation also requires DFG to conduct a series of biological surveys to monitor new introductions to coastal and estuarine waters of the state. The 1999 law required a baseline survey of the state's ports, harbors and bays. The 2003 statute expanded the baseline to include outer coast sites and then required continued monitoring of all sites to determine if the ballast control measures have been successful in reducing the number of new introductions.

California Ocean Protection Council Strategic Plan
http://resources.ca.gov/copc/strategic_plan.html
http://resources.ca.gov/copc

The California Ocean Protection Council, formed to coordinate the activities of ocean-related state agencies and improve state efforts to protect ocean resources, among other things (see State Agencies), adopted a five-year strategic plan in 2006. The plan supports the completion and implementation of both the state rapid response plan and AIS management plan for invasive species, as well as the California Noxious and Invasive Weed Action Plan.

CALIFORNIA STATE AGENCIES

California Department of Boating and Waterways (DBW)
http://www.dbw.ca.gov/

DBW works to help develop convenient public access to California waterways, promote on-the-water safety, and keep waterways free of the navigational problems. General activities include boating law enforcement, boater education, improvements to boating facilities, and vessel sewage management. In addition, DBW manages the state's largest and oldest aquatic weed control program, working with other public agencies to control the widespread water hyacinth (*Eichhornia crassipes*) -- and more recently Brazilian elodea (*Egeria densa*) -- in the Sacramento-San Joaquin Delta, its tributaries, and the Suisun Marsh. DBW also leads the California Clean Boating Network – a collaboration of government, business, boating, and academic organizations working to increase and improve clean boating education efforts, including invasive species education, across the state. Though DBW has the authority to manage the recreational boating vector of AIS into California, it has made no comprehensive effort to date to quantify or assess the risks from this vector.

California Coastal Commission (CCC)
http://www.coastal.ca.gov/

The California Coastal Commission is mandated to protect and enhance public access, recreation, wetlands, visual resources, agriculture, commercial and industrial activity, and environmentally sensitive habitats within the coastal zone through coastal development permits, local coastal programs, and federal consistency review. The Coastal Commission has a responsibility to protect both the biology of aquatic ecosystems and the special uses associated with the marine environment, such as commercial fishing and recreation. The Coastal Commission regulates development activities in state waters under its coastal development permit authority and is responsible for working with local governments within the coastal zone. The Coastal Commission is also the designated coastal management agency administering the federal Coastal Zone Management Act (CZMA) over Pacific waters offshore of California (outside of San Francisco Bay). As such, the Coastal Commission exercises federal consistency review authority over all federal activities and federally licensed, permitted, or funded activities affecting the coastal zone, regardless of whether the activity occurs within, landward, or seaward of the coastal zone boundary. Federal agency activities, including permits and plans, are subject to the consistency determination process, and must be "consistent to the maximum extent practicable" with the state's coastal management program, in this case, the Chapter 3 policies of the California Coastal Act (15 CFR § 930.32).

California Department of Fish and Game (DFG)
http://www.dfg.ca.gov/
http://www.dfg.ca.gov/ospr/

DFG has jurisdiction over the conservation, protection, and management of fish, wildlife, plants, and habitat necessary for biologically sustainable populations of those species. DFG conducts a number of programs related to aquatic invasive species, including serving as the lead agency in developing this statewide AIS management plan, as well as a rapid response plan for invasions (see Appendix C). DFG is responsible for enforcement of regulations concerning the aquaculture industry; the importation and transport of live wild animals, aquatic plants and fish into the state; and the placement of any such animals in state waters. The agency is also responsible for conducting biological surveys to assess the amount and types of AIS present in state waters, and the degree of success of ballast water management activities. Starting in 1999 with ballast management legislation, these surveys have been undertaken by DFG's Office of Spill Prevention and Response (OSPR). DFG/OSPR also manages the California Aquatic Non-native Organism Database (CANOD), and is working to establish consistency among the various

major databases being used to analyze similar types of AIS-related information. Lastly, DFG has been an active manager or partner in numerous AIS eradication and control programs – especially those AIS that threaten or undermine the health of endangered species or the conservation and restoration of the aquatic ecosystem.

California Department of Food and Agriculture (DFA)
http://www.dfa.ca.gov/

DFA is the lead agency for regulatory activities associated with aquatic weeds. This regulatory authority includes quarantine, exterior pest exclusion (border stations, inspections), interior pest exclusion (pet/aquaria stores, aquatic plant dealers, and nurseries), and detection and control/eradication programs. In addition, the DFA Plant Pest Diagnostic Center identifies plant species and assigns plant pest ratings. DFA maintains a rated list of noxious weed species. "A"-rated pests require eradication, containment, rejection, or other holding actions at the state-county level. Quarantine interceptions are to be rejected or treated at any point in the state. For "B"-rated pests, eradication, containment, control, or other holding actions are taken at the discretion of the agricultural commissioner. State-endorsed holding actions and eradication of "C"-rated pests occur only when these pests are found in a nursery. Action is taken to retard spread outside of nurseries at the discretion of the commissioner. Rejection occurs only when found in a crop seed for planting or at the discretion of the commissioner. "Q" ratings are temporary "A" ratings pending determination of a permanent rating. Species on List 2, Federal Noxious Weed Regulation, are given an automatic "Q" rating when evaluated in California. DFA is also responsible for the *Hydrilla verticillata* eradication program (see Chapter II, p. 11).

California Department of Parks and Recreation (DPR)
http://www.parks.ca.gov/

DPR manages more than 270 park units and approximately 1.4 million acres, with more than 280 miles of coastline and 625 miles of lake and river frontage. Management objectives of individual properties within the system depend on a unit's classification, and range from a preservation mandate to a recreation emphasis. Units of the state park system can be established in either the terrestrial or underwater environment. Management to restore natural processes is basic to many types of state park units. This management includes removal of exotic species and is expected to extend below the waterline in units that are primarily terrestrial.

California Department of Water Resources (DWR)
http://www.water.ca.gov/

DWR addresses invasive species issues that impact water supply and delivery, and flood control. In general, DWR administers programs involving flood control for the Central Valley, dam safety for more than 1,200 dams statewide, design and construction of water facilities, water quality improvement, and water supply data collection and studies, among other things. DWR also operates and maintains the State Water Project (SWP).

Recent activities related to invasive species are diverse. DWR conducts monthly monitoring of benthic (bottom-dwelling) invertebrates, zooplankton and phytoplankton throughout the upper San Francisco Estuary and reports trends in invertebrate abundance and community composition, including newly introduced species, to the State Water Resources Control Board. DWR is also documenting the distribution of the invasive algal species Microcystis spp. in the upper San Francisco Estuary, investigating which strains (toxic versus non-toxic) are present, and examining effects on the aquatic food web. DWR is also investigating the impacts of the Chinese mitten crab (*Eriocheir sinensis*) on the benthic invertebrate community in the Sacramento-San Joaquin Delta, and co-authored a white paper on its life history. On the prevention front, DWR implemented the California Zebra Mussel Watch Program until June 2005 (which included risk assessment, early detection, public outreach, and the development of a rapid

response plan for the Central Valley watershed and a centralized reporting system for mussel sightings). The future of this program depends on funding. Up at Lake Davis, DWR has been coordinating with DFG on northern pike control and downstream protection (including the installation of a structure to prevent pike escape over the dam). DWR also contributes to programs aimed at controlling invasive weeds along eroding Sacramento River banks, within flood control and water conveyance structures, and along urban streams. The agency coordinates its activities with other state and federal agencies as a member of the CALFED Non-native Invasive Species Advisory Council (NISAC).

California Ocean Protection Council (OPC)
http://www.coastalconservancy.ca.gov/

The OPC, created in 2004, is a state cabinet level council consisting of the Secretaries for Resources and the California Environmental Protection Agency, the chair of the State Lands Commission, and two members of the Legislature. The OPC is a policy making body and also prioritizes the expenditure of various funds appropriated to other State departments for ocean protection purposes. The OPC has authorized funding for the completion of this AIS plan, and is considering inclusion within its strategic plan the implementation of this plan as a major objective over the next five years. OPC's affairs are administered by the Coastal Conservancy with direction from an Executive Policy Officer housed at the Resources Agency.

California State Lands Commission (SLC)
http://www.slc.ca.gov/Division_Pages/MFD/MFD_Programs/Ballast_Water/Ballast_Water_Default.htm

SLC manages the mandatory, statewide, multi-agency Ballast Water Management Program. This program works to implement regulations governing ballast water management for vessels operating on the West Coast of North America. Commission inspectors board approximately 25% of all vessels that arrive to California to verify compliance with regulations, and to disseminate outreach materials to vessels and crews new to California. In addition to its regulatory activities, the Commission facilitates scientific research and technology development to enhance management efforts of the program, and to inform policymakers. Limited funding is provided for research that targets priority information gaps, and to technologies that show exceptional promise for the treatment of ballast water. In recent years, the Commission has also prepared a number of reports for the state legislature: documenting commercial vessel fouling in California, proposing performance standards for ballast water discharges, and summarizing vessel ballast water activities and compliance in California (see also Ballast Water Management, California Authorities, and Chapter IV). In addition to the mandated Marine Invasive Species Program, the SLC has been coordinating interagency efforts to manage invasive aquatic plants, such as Eurasian watermilfoil (*Myriophyllum spicatum*), in Lake Tahoe (see Case Study, Chapter V).

State Coastal Conservancy (SCC)
http://www.coastalconservancy.ca.gov/

The Conservancy has been involved for over twenty years in the control and eradication of aquatic invasives, pursuant to Division 21 of the Public Resources Code. The Conservancy developed, funded, and has operated the Invasive Spartina Project in San Francisco Bay that shows great promise in eradicating various invasives species of *Spartina* and its hybrids that threaten to destroy mudflats and drainage channels. The Conservancy is also heavily involved in efforts to control *Arundo* in many coastal watersheds. The Conservancy directly develops projects and provides grant funds related to resources enhancement and restoration, including control and elimination of invasives. The Conservancy is also a partner in developing this management plan.

The San Francisco Estuary Invasive Spartina Project
http://www.spartina.org/

The Conservancy established the Invasive Spartina Project (ISP) in 2000. Its overall goal is to develop and implement a regionally coordinated project to eradicate the four introduced and highly invasive *Spartina* (cordgrass) species in the San Francisco Estuary. The ISP is comprised of a number of components, including outreach, research, permitting, mapping, monitoring, and the allocation of funds for efforts to eliminate populations of nonindigenous *Spartina*. In 2005 the Conservancy and ISP began full-scale implementation of the regionally coordinated Spartina Control Program (SCP), employing an aggressive treatment strategy to target nearly all infested sites in the San Francisco Estuary. Initial results show on average about 85% efficacy at treated sites. The Conservancy will continue to coordinate the regional control effort through the ISP, and to allocate funds to land owners and managers around the San Francisco Bay for aggressive treatment activities consistent with the SCP. If funding continues, it's expected that invasive *Spartina* will be effectively eradicated from the San Francisco Estuary between 2009 and 2011 (see also Case Study, Chapter V).

State Water Resources Control Board (SWRCB)
http://www.swrcb.ca.gov/

The SWRCB's mission is to preserve, enhance, and restore the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations. The Board has joint authority over water allocation and water quality protection. Under the State Board are nine Regional Water Quality Control Boards (RWQCBs). The SWRCB and regional boards have no specific policies and programs related to AIS but have been working in support of, and in an advisory capacity to, other state agencies on various related activities such as hull fouling and ballast water management. Invasives come under water board purview as part of the state's efforts to implement and enforce the Clean Water Act (CWA, see also Appendix B). A 2005 federal court ruling defining non-indigenous species as "pollutants" present in discharges from vessels, and finding that such discharges are not exempt from permitting requirements (NPDES, see also CWA, Appendix B). In terms of AIS management activities, some of the regional boards have also sought to place specific water bodies within their regions on the CWA's 303(d) list, as impaired by exotics. S.F. Bay was listed in 1998. In 2006, the State Board will consider listing proposals for the Delta, the upper San Joaquin River and the Cosumnes River. Once on the 303(d) list, the regional boards are required to develop discharger/source based programs for managing pollutant loads (called TMDLs), which in the case of exotics has proved somewhat difficult to develop. Trying to allocate loads, or goals for zero loads, among dischargers, water users and municipalities is challenging when most of the water bodies in question are already heavily invaded. Despite the implementation challenges, the S.F. Bay board's work on the state's first exotics TMDL did, however, widely publicize the problem and led to other successful AIS management and legislative programs. Other regional boards have become involved in AIS-related water quality issues through watershed management projects, non-point source pollution management programs, and wetland mitigation and restoration programs (raising issues about the use of non-native aquatic plant species for these programs, and the control of invasives, for example). The State Board has also participated in AIS management activities concerning the use of aquatic pesticides.

University of California
www.universityofcalifornia.edu
www.ipm.ucdavis.edu/

The University of California conducts extensive research on invasive species issues, and also runs the U.C. Statewide Integrated Pest Management Program. This program, through a special grant from the USDA, also funds the Exotic Pests and Diseases Research Program that provides relatively small grants for investigators working on emerging issues and novel control techniques for diseases and pests in natural, urban and agricultural environments.

APPENDIX D: OTHER AIS INTERESTS

COORDINATING COMMITTEES, EDUCATIONAL INITIATIVES & SPECIAL INTEREST GROUPS

AIS spread across so many jurisdictions and impact so many different types of human activities and environmental priorities that diverse efforts have been made to promote coordination among AIS-involved agencies, organizations and stakeholders. Some of these, such as CALFED, are interagency cooperating groups with their own authorities. Others such as the Western Regional Panel serve important functions in implementing federal and state mandates for coordination. And others provide ongoing forums for information sharing and priority setting among different agencies, organizations and interest groups, or among those attempting to restore or preserve specific waterways.

COORDINATING COMMITTEES & PARTNERSHIPS

ANS Task Force
www.anstaskforce.gov

Federal legislation established the national Aquatic Nuisance Species Task Force, co-chaired by the USFWC and NOAA. The Task Force is charged with coordinating governmental efforts related to ANS prevention and control. The ANS Task Force consists of 10 federal agency representatives and 12 ex officio members representing nonfederal governmental agencies.

Adopt-A-Riverway Program

This program is a government-volunteer partnership established in 2003. Participation in the program includes management of noxious and invasive weeds. Authorized program activities include planting and establishing native seedling trees, shrubs, native grasses, and wildflowers, and removing litter and weeds, consistent with an integrated weed management plan. AB 66, a state bill, established an Adopt-A-Riverway Fund for proceeds donated, appropriated, transferred, or otherwise received for the purpose pertaining to the Adopt-A-Riverway Program.

Association of Fish and Wildlife Agencies (AFWA)
http://www.fishwildlife.org/

The AFWA represents the government agencies responsible for North America's fish and wildlife resources. It promotes sound management and conservation and speaks with a unified voice on important fish and wildlife issues. AFWA was awarded a recent grant to create communications strategies on issues related to unwanted invasive aquatic species. This project will help states develop comprehensive programs to address aquatic nuisance species issues within their states and will collectively help the Regional Associations and the AFWA nationally develop a stronger voice and greater capabilities when addressing regional and national aquatic nuisance species efforts.

California Bay-Delta Authority (CALFED)
http://calwater.ca.gov/

CALFED has been a cooperative effort of more than 20 state and federal agencies working with local communities to improve the water quality and reliability of California's water supplies and restore the San Francisco Bay-Delta ecosystem. One goal of CALFED's Ecosystem Restoration Program (ERP) has been to "prevent establishment of and reduce impacts from non-native species." The goal includes 10 specific objectives, such as eliminating further introductions of new species in ballast water of ships and preventing the invasion of the zebra mussel invasion into California. CALFED has also develop a strategic plan for mananging nonnative invasive species in the San Francisco Bay-Delta Estuary and the Sacramento and San Joaquin rivers and associated watersheds. To date, CALFED has funded 31 projects that address preventing the

establishment of, or reducing the impacts from, non-native invasive species in California. CALFED also created a Non-native Invasive Species Advisory Council (NISAC) -- a council of agency and technical stakeholders – to advise the authority on non-native invasive species.

California Interagency Noxious Weed Coordinating Committee (**CINWCC**)
http://www.DFA.ca.gov/phpps/ipc/CINWCC/cinwcc_hp.htm

This committee was formed in 1995, with a memorandum of understanding among 14 federal and state agencies, as the California Interagency Non-Native Invasive Plant Committee. The committee changed its name in 2006. Its mission is to facilitate, promote, and coordinate the establishment of an integrated pest management partnership between public and private land managers toward the eradication and control of noxious weeds on federal and state lands and on private lands adjacent to public lands.

California Invasive Plant Council (**Cal-IPC**).
www.cal-ipc.org

This Council works to protect California wildlands from invasive plants through research, restoration, and education. Cal-IPC proposes and facilitates solutions to problems caused by invasive plants. Membership includes public and private land managers, ecological consultants, researchers, planners, volunteer stewards, and concerned citizens. Cal-IPC is recognized as an authoritative source of new information on all aspects of wildland weed management.

California Invasive Weed Awareness Coalition (**CALIWAC**)
www.cal-ipc.org/policy/state/caliwac.php

This coalition was formed in 2001 to increase awareness of the invasive weed issue in California. The coalition's goals are to support the development of a statewide management plan for invasive weeds; provide a public forum to increase awareness of the detrimental environmental and economic effects of invasive weeds and contribute to solutions for invasive weed issues; promote increased funding for management of invasive weeds; and influence state and national policy on invasive weeds

California Weed Science Society (**CWSS**)
http://www.cwss.org/

This Society was founded in 1948 to promote environmentally sound proactive research and develop educational programs in weed science; support undergraduate/graduate students seeking a career in weed science; and encourage and support educational activities to promote integrated weed management systems.

County Weed Management Areas (**WMA**)
http://www.DFA.ca.gov/phpps/ipc/weedmgtareas/wma_index_hp.htm

County agencies and local weed-specific coordination groups have brought invasive plant prevention and control to a more local level and have increased the sophistication and effectiveness of invasive species management in California. A Weed Management Area (WMA) is a local organization that brings together landowners and managers (private, city, county, state, and federal) in a county, multi-county, or other geographical area for the purpose of coordinating and combining action and expertise in combating common invasive weed species.

Pacific Ballast Water Group (PBWG)
http://www.psmfc.org/ballast/

This group was formed by representatives from the shipping industry, state and federal agencies, environmental organizations, and others who recognized the need for a cooperative

and coordinated regional approach to ballast water management to prevent the introduction of invasive species on the West Coast. The PBWG meets regularly and is currently addressing the development of ballast water discharge standards and inter-jurisdictional issues related to ballast water management on the West Coast.

Pacific States Marine Fisheries Commission (PSMFC)
http://www.psmfc.org/

PSMFC is one of three interstate commissions dedicated to resolving fishery issues. Representation includes the states of California, Oregon, Washington, Idaho, and Alaska. The PSMFC does not have regulatory or management authority. Rather, it serves as a forum for discussion, works towards coastwide consensus on state and federal authorities, and addresses issues that fall outside state or regional management jurisdiction. Over the past four years, the Marine Fisheries Commission's AIS program has concentrated on four species of aquatic invaders: mitten crab (*Eriocheir sinensis*), European green crab (*Carcinus maenas*), zebra mussel (*Dreissena polymorpha*), and Atlantic salmon (*Salmo salar*). Program activities include research and monitoring, educational outreach, interjurisdictional planning and coordination, and funding and contracting services for numerous partners

Western Governors Association
http://www.westgov.org/

The Western Governors' Association is developing a new program to address undesirable non-indigenous aquatic and terrestrial species in the west. In 1998, the Western Governors passed a resolution on Undesirable Aquatic and Terrestrial Species to: develop and coordinate western strategies and to support management actions to control and prevent the spread and introduction of undesirable species; support the use of integrated pest management concepts; encourage broad-based partnerships; and urge adequate support for the U.S. Department of Agriculture's Animal and Plant Health Inspection Service. The Association has formed a working group of state and federal agencies, industry, non-governmental organizations, and academia to develop western strategies to limit the spread of these species.

Western Regional Panel (WRP)
http://www.fws.gov/answest/

This panel on Aquatic Nuisance Species was formed after the passage of, and as a result of, NISA to help limit the introduction, spread, and impacts of aquatic nuisance species into western North America. This panel includes representatives from federal, state, and local agencies, from Native American tribes, and from private environmental and commercial interests, as well as a representative from Canada.

The general goals of the WRP are to prevent nuisance species introductions, coordinate activities of the western states among federal, local and tribal agencies and organizations, and minimize impacts of already established nuisance species. The purposes of the WRP, as described in NISA, are to: identify western region priorities for responding to aquatic nuisance species; make recommendations to the Task Force regarding an education, monitoring (including inspection), prevention, and control program to prevent the spread of the zebra mussel west of the 100th meridian; coordinate other aquatic nuisance species activities in the west not conducted pursuant to the Act; develop an emergency response strategy for federal, state, and local entities for stemming new invasions of aquatic nuisance species in the region; provide technical assistance to public and private stakeholders for preventing and controlling aquatic nuisance species infestations; and submit an annual report to the Task Force describing activities related to ANS prevention, research, and control.

MAJOR NATIONAL EDUCATION CAMPAIGNS

100th Meridian Initiative, USFWS
http://www.100thmeridian.org

The primary goal of the 100th Meridian Initiative is to prevent the further spread of zebra mussels. It is the first large-scale, cross-jurisdictional effort to combat the spread of an aquatic invasive species. Participating entities include federal, state, local, and tribal governments, potentially affected industries such as commercial boat haulers, and other stakeholders. The group takes its name from the current western limit of zebra mussel populations in the United States, which roughly coincides with the 100th meridian. The initiative has produced an extensive public information and education campaign aimed at marina users, anglers, and recreational boaters. It sponsors the production of posters, informational flyers, and signs educating boaters about the risks of zebra mussels and other AIS. Its members conduct voluntary boat inspections and boater surveys to identify boats at highest risk for harboring AIS. Collected boater travel patterns are being used to model potential pathways for the mussel's spread. The initiative has supported the establishment of mussel monitoring stations across the west, as well as the development of regional rapid response plans should the mussel establish new populations. Recent programs include the Lewis and Clark Initiative, a program aimed at increasing outreach efforts to recreational boaters retracing the path of the historic expedition during its bicentennial. Among other accomplishments, the effort resulted in the establishment of more AIS monitoring stations and a mussel monitoring database for the Columbia River Basin region.

Habitattitude
www.habitattitude.net

Habitattitude is an Aquatic Nuisance Species Task Force Partnership representing the Pet Industry Joint Advisory Council (PIJAC), the U.S. Fish & Wildlife Service, the NOAA National Sea Grant College Program, and the nursery and landscape industry. It was established in 2004 to educate aquarium hobbyists, backyard pond owners, water garden enthusiasts, and others on how to prevent the spread of potential aquatic nuisance species. Its web site includes information on how nonnative fish and plants and can harm ecosystems, suggests environmentally sound alternatives to releasing unwanted aquatic plants and animals in the wild, and offers tips on how to prevent accidental . The site offers promotional materials, signage, and decals for participating retailers and manufacturers. The initiative offers a means for industry and the USFWS to come together to promote their shared interests in preventing AIS impacts.

Stop Aquatic Hitchhikers
www.protectyourwaters.com

The Stop Aquatic Hitchhikers web site is part of the Aquatic Nuisance Species Task Force public awareness campaign. It is sponsored by the U.S. Fish and Wildlife Service and the U.S. Coast Guard. It functions as a reputable, central source of information about aquatic nuisance species affecting the United States. Resources include photos and descriptions of common nuisance species, how they impact ecosystems, boaters, and anglers, and tips for preventing their spread. A news page features stories from major news outlets as well as government news releases related to AIS. Video and audio clips geared toward traveler information centers are available for download, as are outreach materials such as posters and flyers, stickers for tackle boxes, and banners and signs. Clubs, state and government agencies, and private entities are encouraged to join the campaign and pledge to prevent the spread of AIS. In California, partners include the California Department of Fish and Game, California Trout, the City of Davis, Heal the Bay (Santa Monica), and the Santa Ana Zoo, among others.

SPECIES- & PLACE-SPECIFIC COALITIONS & INITIATIVES

100th Meridian Initiative, USFWS
(see Major National Education Campaigns)

Lower Colorado River Giant Salvinia Task Force
http://lcrsalvinia.org/salviniahome.asp

On August 4, 1999, the U.S. Fish and Wildlife Service found *Salvinia molesta* in the Imperial National Wildlife Refuge on the Colorado River. Plants were also seen floating down the Colorado River, on the Cibola National Wildlife Refuge, and in Pretty Water and Three Finger lakes. Subsequent investigation determined that the source of the infestation was the West Side/Outfall Drain of the Palo Verde Irrigation District near Blythe, California. To ensure a coordinated response to the infestation, a task force was formed. Teams focused on accomplishing steps to control and/or eradicate *Salvinia molesta* in the lower Colorado River. Teams address issues relating to research, monitoring, rapid response, field implementation, regulation and compliance, outreach, and financial and international issues.

Southern California Caulerpa Action Team (SCCAT)
http://www.sccat.net/

SCCAT is a committee established to respond quickly and effectively to the discovery of *C. taxifolia* in Southern California. The group consists of representatives from local, state, and federal governmental entities and from private organizations. SCCAT's goal is to completely eradicate all *C. taxifolia* infestations in Agua Hedionda and Huntington Harbour and to prevent new infestations (see also Chapter V, Case Study)

Team Arundo
http://www.sawpa.org/arundo/
http://ceres.ca.gov/tadn/

Team Arundo was formed in Orange County, California, in 1991 to control *Arundo donax* along the Santa Ana River, and has since become a statewide program. Chapters exist in the Bay Area, San Luis Obispo and surrounding counties, Greater Los Angeles County, and San Diego County. Team Arundo del Norte is a forum of local, state, and federal organizations dedicated to the control of *Arundo donax* in rivers, creeks, and wetlands in Central and Northern California. The organization formed in the summer of 1996 and meets several times per year in the Sacramento area to explore opportunities for information exchange and partnerships in support of the ongoing work of eradicating *Arundo*.

Invasive Spartina Project
(see Appendix C, State Coastal Conservancy)

Tahoe Basin Weed Coordinating Group
(775)-784-4848

This group is coordinated through the University of Nevada Cooperative Extension to address the increasing aquatic weed problem in the two-state Lake Tahoe Basin. This group and local agencies have undertaken a successful mechanical removal of Eurasian watermilfoil and efforts are now being expanded based on this success. Local interests are now working (as of 2006) on a Memorandum of Understanding among many federal, state, and local agencies acknowledging the aquatic invasive plant problem at Lake Tahoe and how the agencies and other organizations will coordinate efforts to effectively control and manage invasive aquatic weeds throughout Lake Tahoe, including Tahoe Keys and other private marinas (see also Case Study, Chapter V).

APPENDIX E: AIS PLAN DEVELOPMENT & PROCESS

The California Aquatic Invasive Species Management Plan provides a framework for responding to aquatic invasive species in California, and for protecting the biological integrity of California's waters and native plant and animal communities. This plan targets both marine and freshwater environments.

An initial draft was developed for DFG several years ago which included stakeholder input (see below). At that time the plan was not completed due to funding and staffing issues. Additional funding was recently been awarded to the San Francisco Estuary Project from the Ocean Protection Council, through the State Coastal Conservancy, to finish the State AIS Management Plan, and begin implementation of the plan.

2006 Draft Process

This 2006 draft of the plan incorporates much of the text, research and public and stakeholder comments provided by the original 2004 draft (see below).

In early 2006, agency staff reviewed the 2004 version and suggested updates. The resulting draft was circulated two times for review and comment by AIS program managers within lead state and federal agencies. Two internal meetings – one in June, and one in July -- were held to discuss the draft, and documented in meeting notes. Revisions were made accordingly.

The resulting draft plan was posted for public review on August 22nd, 2006. Three public meetings will be held in August and September 2006 in Oakland, Sacramento and Long Beach to review the draft plan. Public comments will be incorporated in the plan before the official approval process moves forward, and documented in the final draft of this appendix.

Attendees at one of more of two 2006 internal inter-agency meetings included:

Susan Ellis, DFG
Abe Doherty, SCC
Julie Horenstein, DFG
Dan Wilson, DFG
Paul Ryan, DBW
Geoff Newman, DBW
Terri Ely, DBW
Marian Ashe, DFG/OSPR
Jeffrey Herod, USFWS
Marcia Carlock, DBW
Suzanne Gilmore, SLC
Tanya Veldhuizen, DWR
Lynn Takata, SLC
Ben Becker, NPS
Karen McDowell, SFEP
Maurya Falkner, SLC
Pat Akers, DFA

2004 DRAFT PLAN PROCESS

The first draft of the AIS management plan included valuable input of many dedicated individuals with expertise on a wide variety of topics relating to AIS in California and the region. Contributors ranged from local, state and federal agencies, to industry representatives, NGOs and other stakeholders.

Funding for the development of the 2004 Plan was provided by the DFG and USFWS. Susan R. Ellis, the Statewide Invasive Species Coordinator developed a contract with the Regents of the University of California, Davis, to develop an Aquatic Invasive Species Plan following the general outline provided by the Aquatic Nuisance Species Task Force. Ted Grosholz was the Principal Investigator for the contract. The deliverables for the contract included facilitated meetings to ensure that agency and stakeholder input was incorporated in the Plan.

In August of 2002, representatives of 14 agencies with a role in managing aquatic invasive species came together to participate in a State AIS Planning Workshop held at the University of California in Davis, CA. Results of that meeting included a draft set of goals and objectives for an AIS Plan and a brief summary of current AIS activities for some of the participating agencies. There was agreement that a state plan could help identify AIS of concern, and provide a framework for how to address AIS prevention, eradication, research, management, and education and outreach in a more coordinated and comprehensive fashion.

In order to get input on AIS concerns and perspectives from a broad array of stakeholders during the plan's development, meetings were held in northern and southern California (November 19, 2002 and March 20, 2003, respectively). Participants in these meetings and their specific comments are located on the following pages. Much effort has been put into ensuring that stakeholder comments from these meetings have been incorporated into the plan's Strategies and Actions.

Additional information for the plan was gathered from other state and federal plans, various websites, published papers, internal agency documents, and through personal communication (phone and email).

The Plan's Review Committee (members listed below) commented on a first draft of the plan, which was then distributed to a broader group of Agency reviewers and for public review.

Review Committee for the 2004 Draft Plan

Lars Anderson, United States Department of Agriculture, Agricultural Research Service

Robert Leavitt, California Department of Food and Agriculture

Dale Steele, California Department of Fish and Game

Mark Sytsma, Portland State University

Erin Williams, United States Fish and Wildlife Service

Participation by Other Agencies and Groups

Courtney Albrecht, California Department of Food and Agriculture
Marcia Carlock, California Department of Boating and Waterways
Marina Carzola, California Coastal Commission
Jason Churchill, Lahanton Regional Water Quality Control Board
Nate Dechoretz, California Department of Food and Agriculture
Joseph DiTomaso, University of California, Davis
Maurya Falkner, California State Lands Commission
Connie Ford, State Water Resources Control Board
Joann Furse, California Sea Grant
Eric Gillies, California State Lands Commission
Bob Hoffman, National Marine Fisheries Service
Christina Johnson, California Sea Grant
Jaime Kooser, California Coastal Commission
Steve Lonhart, Monterey Bay National Marine Sanctuary

Karen McDowell, California Sea Grant
Cindy Messer, California Department of Water Resources
Julie Owen, California Department of Boating and Waterways
Bill Paznokas, California Department of Fish and Game
Stephen Phillips, Pacific States Marine Fisheries Commission
Carolyn Pizzo, U.S. Department of Agriculture
Jim Rains, California Department of Food and Agriculture
Steve Schoenig, California Department of Food and Agriculture
Jody Sears, California Department of Water Resources
Linda Sheehan, Pacific Regional Office, The Ocean Conservancy
Basia Trout, Bureau of Reclamation
Tanya Veldhuizen, California Department of Water Resources
Kim Webb, United States Fish and Wildlife Service
Katherine Zaremba, Invasive Spartina Project

2002-2003 Stakeholder Meeting Comments

Incorporating recommendations from a broad array of stakeholders contributes to a better and more responsive AIS plan for the State of California. In an effort to get input on concerns and perspectives regarding AIS during the plan's development, scoping meetings were held to get input from many organizations, businesses, industry representatives and individuals. A northern California stakeholder meeting was held in Sacramento on November 19, 2002. A southern California stakeholder meeting was held on March 20, 2003. Participants provided valuable comments, most of which have been incorporated into the management plan.

Northern California Stakeholder Comments

Invitations were sent to over 200 individuals and included representatives of many industries including the pet, aquarium, and nursery/landscaping trades, live bait and seafood dealers, and ports and marinas. The following individuals attended:

Drew Alden, Growers in Tomales Bay
John Berg, Pacific Merchant Shipping Association
Thomas Confal, IPM Specialist, Bitterroot Restoration, Inc.
John Cruger-Hansen, Harbor Master, City of Antioch
Daniel Garcia, Public Affairs, Marine Aquarists Roundtable of Sacramento
Jeff Hart, President, Habitat Assessment and Restoration Team, Inc.
James Kidder, President, Colombo Bait, Inc.
Karen McDowell, Project Coordinator, West Coast Ballast Outreach Project
James Mills, Vice President and Regional Manager, Westree Marinas
Fleur O'Neill, Policy Education Coordinator, Save Our Shores
John O'Sullivan, Curator of Field Operations, Monterey Bay Aquarium
Roger Phillips, Applied Research Manager, Monterey Bay Aquarium
Kirsten Upson, The Nature Conservancy
M.K. Veloz, Administrative Director, Northern California Marine Association

Mike Fraidenburg of Dynamic Solutions Group of Olympia, Washington facilitated the meeting. Susan Ellis (State Invasive Species Coordinator) explained the different roles and responsibilities of state agencies and current management activities for aquatic invasive species in California. Ted Grosholz (UCD) and Holly Crosson (UCD) discussed the process for the plan's development including future stakeholder and agency meetings as well as the current status of the plan. Mark Sytsma (Portland State University, Portland, Oregon) discussed Oregon's experience with writing a state management plan for aquatic invasive species as well as the uses and limits of state plans. The rest of the meeting was spent listening to concerns and suggestions presented by the stakeholders. Most of the comments could be

divided into the categories of Education, Prevention, Best Management Practices, Regulation, State Invasive Species Council and General AIS Management Plan development suggestions.

- **EDUCATION**

- Education about AIS should be a top priority
- Educational tools should be used instead of legislation and regulations
- A list of AIS experts should be made available to stakeholders
- AIS information should be available at all bait shops, marinas, boat access areas, etc.
- It may take 20 years, but *all* of the public needs to be educated about AIS (example used was educational programs for dealing with issues such as recycling, littering, etc.)
- The public needs to know why they should care about AIS (i.e., the consequences of invasions)
- The public as well as industry needs to know the economic cost of AIS (cost/benefit analysis)
- Stakeholders are a resource and can help with education, such as public service announcements
- Multiply educational efforts by identifying what industry sectors can do to help with AIS education and outreach (i.e., using Walmart, Home Depot, Petsmart etc. to educate their customers about AIS)
- A database is needed that focuses on providing information about AIS outreach, education and research-based grants. Information on who is doing what on AIS should also be available and include efforts by NGO's, universities and industry.
- AIS hazards that exist in particular areas need to be identified and publicized before they spread.
- Cross-education between interest groups and government would help understanding of the issues and concerns for both groups
- Education in the K-12 classroom is important; biologists should go into schools to talk about AIS
- Aqua-culturists need current information to help avoid AIS introduction problems of the past
- There should be guidelines developed to help groups "self-police" and educate their constituents
- Coordination needs to be improved between state, regional and federal groups
- Identify all educational and technical resources currently available and make them easily accessible
- Identify where the information gaps are

- **PREVENTION (including Early Detection and Rapid Response)**

- A Rapid Response program requires extensive coordination but is critical
- An AIS "hotline" is needed so new sightings can be reported immediately
- Management of introduction pathways is important for AIS prevention
- We should have the ethic of not transporting California's AIS elsewhere; include this in the plan
- The largest percentage of funds should be spent on prevention since it is the most cost-effective
- Early detection is key to successful AIS eradication and management
- Each vector/pathway that is identified in the plan should have a lead agency listed as well as a stakeholder group
- Look into whether funds from anti-terrorism sources could be tapped into (i.e. to address the intentional introduction of a devastating foreign, water-borne organism)

- **BEST MANAGEMENT PRACTICES (BMPs)**

- Each industry should be actively involved in the development of the BMPs that relate to them
- BMPs can be a tool for industry to understand and meet their obligations
- Consider using a neutral third party or group (scientific panel) to offer advice and develop recommendations for BMPs instead of leaving development to agencies or industry alone
- Investigate how "management" of a landscape (or lack thereof) affects the likelihood of invasion

- **REGULATION**

- The public and industry need to have an understanding of AIS laws and their history before they go into effect
- We need more education and outreach on laws already passed so the public can abide by them
- AIS laws and penalties need to be publicized in the CDFG regulations right up front
- Regulatory agencies need to "get on the same page"; inconsistencies confuse the public
- There should be more opportunity for stakeholder input when new regulations are being written, especially when livelihoods are at stake (*Caulerpa* in southern California was example used)
- A patchwork of regulations makes coordination between state, regional and federal levels difficult
- Inter-jurisdictional coordination needs improvement to make compliance easier
- Guidelines need to be developed for meeting NPDES permit requirements
- A process needs to be developed to authorize within-state transfer of approved live aquatic species
- Laws, regulations and permits need to be more clear, consistent and effective
- Enforcement needs to be more vigilant and consistent
- Stakeholder input should be solicited when permitting procedures are being written
- New legislation should be written with the help of stakeholders (ballast water example was used)
- Methods for complying with aquaculture regulations need to be more clear
- Some stakeholders feel like they are working in a vacuum; they need guidelines to help them determine if the right thing is being done
- Develop a mechanism for mandatory reporting of listed AIS
- Make sure regulations that affect industry are feasible (shipping example was used)
- Use existing Department of Boating and Waterways (CDBW) laws to make AIS introductions illegal
- Create a single, central clearing house for information on all AIS laws and regulations

- **STATE AQUATIC INVASIVE SPECIES COUNCIL (ISC)**

- The ISC needs to have broader public representation; consider expanding it to include more stakeholder groups
- Each industry should decide who will represent them on the ISC
- The number of industry representatives should be equal to or higher than the number of government representatives on the ISC
- DBW should not represent all boating interests on the ISC

- **GENERAL AIS MANAGEMENT PLAN DEVELOPMENT**

- Make the plan short and simple
- Funding priorities in the plan should be delineated by the ISC or another representative group
- Work together; don't have government on one side and resource users on the other
- Stakeholders are interested in practical solutions
- Use common names in addition to scientific names for AIS to make the plan more user-friendly
- Limit use of acronyms or fully explain them
- Prioritization of species within the plan is necessary
- Develop a system to prioritize aquatic invasive species using the ISC or another representative group
- Use assigned "Management Classes" as Oregon did rather than prioritizing species
- Consider using CDFA's ABC List of Noxious Weeds as a model
- Develop a process to determine which method gets used to control or eradicate a species
- Limit administrative overhead
- Develop a process to resolve disputes
- Make sure all groups are represented (include tribes, irrigation districts, bass anglers, boaters, etc.)
- The planning effort should take into account the target species as well as the environment

- There is a concern that some may try to sidetrack the plan or use the plan to push their own agenda
- Consider using AIS instead of ANS (the word "invasive" is perhaps better than "nuisance")
- Write into the plan that state and federal agencies coordinate through formal written agreements
- High profile species should not take over concern for lesser-known problem species
- Support for current AIS programs should be continued
- Make sure limited resources go to on-the ground projects rather than getting lost in the bureaucracy.

Southern California Stakeholder Comments

Invitations were sent to over 450 individuals and included representatives of local water agencies and irrigation districts, tribes, various industries including the pet, aquarium, aquaculture and nursery/landscaping trades, live bait and seafood dealers, ports, marinas and shippers, and others with an interest in aquatic invasive species. The following individuals attended:

Douglas Ball, Los Angeles Department of Water and Power
Mark Baumann, Live Cargo Reptile and Fish/ San Diego Fish Society
Paul Brown, Project Analyst, Port of San Diego
Thomas Buckowski, Lake Biologist, Lake Mission Viejo Association
Larry Chapp, Vice President, Divisional Merchandise Manager, PETCO
Hugh Cobb, Pacific Coast Bait and Tackle
Tom Gass, Manager, El Pescado Caliente
Chris Graham, Lake Biologist, Lake Mission Viejo Association
Miguel Hernandez, Watermaster, Natural Resources Office, Pauma Band of Mission Indians
Annaliese Hettinger, The Diving Locker
Steve Lonhart, Monterey Bay National Marine Sanctuary
Marshall Meyers, Executive Vice President, Pet Industry Joint Advisory Council
Craig Parsons, Live Fish, Reptile, Bird and Small Animal Buyer, PETCO
Russell Moll, Director, California Sea Grant/ Scripps Institute of Oceanography (SIO)
Anandra Ranasinghe, Southern California Coastal Water Research Project
Freda Reid, San Dieguito Lagoon Committee and Research Associate (SIO)
Andi Shluker, The Nature Conservancy of Hawaii
Ed Smith, General Manager, Palo Verde Irrigation District

Mike Fraidenburg of Dynamic Solutions Group (DSG) of Olympia, Washington facilitated the meeting. Ted Grosholz (UCD) discussed the ecological and economic costs of aquatic invasive species and introduced the goals and purpose of the meeting. Susan Ellis (State Invasive Species Coordinator) explained the different roles and responsibilities of state agencies and current management activities for aquatic invasive species in California, and provided an update on the formation of the California Aquatic Invasive Species Council. Mark Sytsma (Portland State University, Portland, Oregon) discussed Oregon's experience with writing a state management plan for aquatic invasive species as well as the uses and limits of state plans. Holly Crosson (UCD) discussed the process for the California plan's development and progress on the plan thus far. The rest of the meeting was spent discussing concerns and suggestions presented by the stakeholders. Most of the comments could be divided into the categories of Education, Prevention, Best Management Practices, Regulation, and General AIS Management Plan development. Below is a summary of specific comments made under each of these categories.

- **EDUCATION**

- A comprehensive strategy for AIS Education and Outreach should be developed
- Education should be used instead of new legislation and regulation
- More AIS information needs to reach the public, retail stores, industry, schools, etc.

- Prioritize educational efforts based on risk associated with a given pathway
- Piggyback onto current Agency educational programs
- Consider “green labeling” to help consumers make the right choice; peer pressure will encourage appropriate behavior/decisions of others
- Educational efforts need to take into account the multi-cultural nature of CA (signs, etc. need to be published in other appropriate languages besides English)
- Marketing experts should be used to get a single, common AIS message out across the region
- The AIS message has to touch people personally (an impact on the quality of life or the pocketbook)
- Educational materials should be tailored to specific industry sectors (aquaculture, boaters, bait shops, pet/aquarium retailers, etc.)
- The public as well as industry needs to know the economic cost of AIS (pay now or pay more later)
- Stakeholders are a resource and can help with educational efforts (i.e., using Recreational Fisherman’s Alliance, American Sportfishing Association, Diving or Tropical Fish Clubs, etc.)
- Multiply educational efforts by identifying what industry sectors can do to help with AIS education and outreach; partner with pet/aquarium and other industries
- Develop better ways to get the AIS message out, for instance, don’t just have a booth at trades shows but work directly with promoters of shows (example – Fred Hall Show)
- Publish articles in Western Outdoor News and similar magazines
- Train people to use the AIS “Traveling Trunk” and have them take it “on the road”
- A comprehensive AIS species list should be developed and publicized with appropriate contacts listed for experts associated with each species
- There should be guidelines developed to help groups “self-regulate” and educate their constituents

- **PREVENTION (including Early Detection and Rapid Response)**

- An AIS Prevention Program is key to success but is not foolproof
- AIS Screening and Risk Assessment Programs should not be overly simplistic or arbitrary. They need to be based on the best available information and sound science.
- Volunteers can be an important piece in monitoring efforts for early detection of AIS
- Training volunteers takes a lot of organization and keeping them motivated over the long term
- can be challenging
- Interaction with Watershed Councils is important
- An AIS “hotline” is needed so new sightings can be reported immediately
- Determine the economic consequences of pathway prevention
- Look into funds available through “homeland security”

- **BEST MANAGEMENT PRACTICES (BMPs)**

- Develop guidelines for acceptable, humane and environmentally safe ways to deal with unwanted aquatic organisms (whether it be proper disposal, returning the organism to the retailer, or being “adopted” by someone else)
- Industry and individuals need to accept a degree of economic liability and responsibility for their actions regarding AIS introduction and spread
- Create industry standards to regulate and penalize the bad actors
- Each industry should be actively involved in the development of their own BMP’s. Weak industry initiative yields weak BMPs.
- Industry documentation is needed to support accountability
- Determine if BMPs should be regulatory
- Develop BMPs for Bass Tournaments
- BMPs need to maintain some flexibility and an acknowledgement that “one size does not fit all”

- BMPs can help achieve buy-in, create institutional memory, give an outsider a way to monitor activities, and are already an accepted process in industry (similar to ISO example)

- **REGULATION**

- Enforce the laws and regulations we already have, rather than pass new ones
- Provide positive incentives to encourage self-regulation
- Provide better information about what AIS laws are currently in place and how to comply with them
- A few bad apples are causing regulatory problems for all involved
- Determine more effective ways to catch violators of current laws, including interstate transport
- Improve current regulations. Piranhas and snakeheads were used as examples of species that are regulated but still are imported and released. We should learn from these experiences and attempt to prevent similar situations.

- **GENERAL AIS MANAGEMENT PLAN DEVELOPMENT**

- Coordinate with the National Marine Sanctuaries on Plan development
- Work with California Sea Grant to achieve success in plan implementation, especially with education and outreach strategies and actions
- Be creative with funding and partnerships
- Leverage resources by doubling up on surveys, inspections, etc. that are already being done
- Continually evaluate and update the plan and make sure the plan's goals are being realized (develop a scorecard)
- Make sure the functioning of the California Aquatic Invasive Species Council is evaluated so it does not outlive its useful purpose. If changes are needed to make the council more effective, they should be able to be promoted through other agencies and the general public
- Take steps to minimize the loss of dollars through overhead
- Do not set the stage for failure by creating a timeline that can't be met
- Involve economists if possible (can a dollar figure be put on habitat/resources?)
- Make it clear who will determine priorities in the plan and what gets funded
- Incorporate Watershed Councils in the planning effort
- Make the relationship between the plan and AIS policy clear
- Determine how plan implementers will interact with on-the-ground managers
- Write the plan so that it facilitates funding for implementationThe plan should be user-friendly
- Plans should promote accountability so that managers have an incentive to perform and meet commitments

APPENDIX F: ESA POSITION PAPER

Position Paper of the Ecological Society of America

Biological Invasions: Recommendations for U.S. Policy and Management

David M. Lodge, Susan L. Williams, Hugh MacIsaac, Keith Hayes, Brian Leung, Sarah Reichard, Richard N. Mack, Peter B. Moyle, Maggie Smith, David A. Andow, James T. Carlton, and Anthony McMichael, 2006

Executive Summary

The spread of nonindigenous (non-native) species introduced into the U.S. is a significant and growing national problem, costing taxpayers hundreds of billions of dollars in environmental degradation, lost agricultural productivity, increased health problems, and expensive prevention and eradication efforts. Some nonindigenous species are introduced intentionally and are highly valued by humans, e.g., agriculture, aquaculture, and ornamental species. Many other species are introduced as by-products of human activity, especially through the increasing global transportation of humans and commercial goods. A subset of introduced species spread widely, become abundant, and cause harm. The definition of "harm" is a function of human values, which often differ in different regions, and may change temporally. Nevertheless, harm is often unambiguous, and the species from elsewhere that causes harm are referred to as invasive nonindigenous species. They are the focus of policy and management concern because of their serious and complex contributions to diseases of plants, animals, and humans; reductions in native species; changes in ecosystem function; and financial losses.

Well known examples of invasive nonindigenous species include the vine kudzu (*Pueraria lobata*) in the southeastern U.S., cheat grass (*Bromus tectorum*) in the western U.S., and zebra mussel (*Dreissena polymorpha*) in the central U.S. More recent arrivals with large net negative impacts on the environment, agriculture, forestry, industry, and human health include West Nile virus, the seaweed Caulerpa (*Caulerpa taxifolia*), Asian longhorn beetle (*Anoplophora glabrapennis*), emerald ash borer beetle (*Agrilus planipennis*), sudden oak death (*Phytophthora ramorum*), monkeypox virus, and the SARS virus. Without management, the populations of these species grow and spread such that damages accelerate over time. In contrast to many other forms of pollution, such widespread invasions become irreversible because the technology often does not exist to selectively eradicate species. Relative to the economic and ecological costs of other forms of environmental pollution, the costs of nonindigenous species are therefore of particular concern because they are likely to be borne over very long time frames.

Despite the great diversity of invasive species and their impacts, an identified group of pathways transport species, and a common set of biological processes—introduction, establishment, spread, and impact--operate in all invasions. Policy and management solutions become clearer when these common pathways and processes are recognized. Nevertheless the possible management responses diminish as any invasion progresses. Prevention is possible only before a species arrives or at the point of entry. Thereafter, a narrow window of opportunity for eradication exists before some species spread so widely that it is impossible or infeasible to locate and kill all populations. Once a species is too widespread for eradication, only three management options remain: controlling populations in selected locations; active mitigation of impacts; or simply bearing the cost of the changes caused by the invader. U.S. policy, often by default, has largely adopted the last option, i.e., acceptance of often irreversible environmental and economic damage.

The only study to attempt a nationwide estimate of the economic costs to the U.S. of nonindigenous species concluded that annual costs exceed $120 billion (Pimentel et al. 2005), which we regard as an underestimate because the majority of invasive species were not included in the

study. Even this underestimate equates to costs of $1,100 per U.S. household per year, costs that will continue to grow unless prevention and management of invasive species improves. Yet, the U.S. has allowed invasions to continue and damages to increase.

A more cost-effective approach would include greater investments in prevention and other active management steps, including early detection, eradication and control. Recent scientific advances in our understanding of biological invasions make it clear that more effective options exist for these threats. Here, on behalf of the Ecological Society of America, we make six recommendations for government action that, if implemented, would substantially reduce the current and future damages to the U.S. from invasive species. We include proposals for cost-effective government actions that will address these problems with the understanding that other measures are important to complement governmental responses. Key challenges that require urgent government action include prevention, detection, eradication, and control of harmful non-native species, and the coordination of these efforts at the federal, state, and international levels. Table 1 summarizes the major recommendations, data and techniques for implementation, and proposed lead organizations.

Prevention

Recommendation 1. Use a combination of existing and new technologies, education strategies, industry codes of conduct, and government oversight to prevent introductions from pathways that already are well known to be major sources of nonindigenous species, and to monitor other pathways into the United States to better assess the degree of risk they pose.

Recommendation 2. Screen live organisms proposed for importation into the U.S. for environmental, economic, and human health risk before a decision is made to allow entry. Risk analysis tools should be repeatable, transparent, supported by current scientific findings, and applied to all pathways, across all agency jurisdictions.

Early Detection, Eradication and Control

Recommendation 3. Use new technology to improve active surveillance of invasive species to increase the success of rapid response and eradication efforts, in cooperation with existing web-based information networks in universities, herbaria, museums, and state agencies.

Recommendation 4. Make legal authority and emergency funding available for eradication and control to proceed rapidly once a newly established potentially invasive species is detected. Current legal mechanisms and funding for responses to agricultural pests and parasites, and to human pathogens, should be extended to all potentially invasive species in all habitats, and employed commensurate with the threat.

Recommendation 5. Provide on-going funding and incentives for slowing the spread of established invasive species on public and private lands, in cooperation with the states and tribal governing bodies.

Establishing a National Center for Invasive Species Management

Recommendation 6. Expand existing authority of the National Invasive Species Council (NISC), including the establishment of a National Center for Invasive Species Management under NISC, to better coordinate policies among government agencies and with other countries. Current U.S. examples of intergovernmental cooperation include the National Interagency Fire Center and the Center for Disease Control and Prevention. Unless these or conceptually similar recommendations are adopted, the rate of damages to our environment, economy, and health caused by invasive species will accelerate. These damages are spread across many stakeholders, and no strong, nationwide group has emerged to encourage industries that are pathways of introduction to reduce the threat. Hence the federal government must assume greater leadership to coordinate efforts by all

levels of government. We recognize that the problem is complex and interdisciplinary, includes many pathways, a tremendous diversity of organisms that are invasive, and the vulnerability of all terrestrial, marine and freshwater ecosystems. Despite this complexity, and the consequent overlapping and sometimes conflicting state, federal, and international policies involved, the six recommendations described in this paper provide sound guidance for the future. Recent scientific and interdisciplinary advances provide a strong basis for rapid implementation of these cost-effective solutions.

APPENDIX G: LIST OF REGULATED SPECIES IN CALIFORNIA

Aquatic invasive species are regulated by a number of state and federal regulations. The aquatic plant and animal species restricted in California, and the regulations that apply to each, are listed below.

ANIMALS
In California, the animal species considered detrimental to native wildlife, state agriculture or public health and safety are listed in California Administrative Code Title 14, Section 671. Importation, transportation and possession of the restricted animals on this list is unlawful except under permit issued by the California Department of Fish and Game. Animal species restricted by the federal government are considered "injurious wildlife" and named in the Lacey Act (50 CFR 16.11-16.15). The U.S. Fish and Wildlife Service has responsibility for regulating the live importation or shipment of these animals.

California's list of Restricted Animals
http://ccr.oal.ca.gov
Click on the following link: "Search for a Specific Regulatory Section"
Title: 14
Section: 671

Injurious Wildlife Species List (PDF)
U.S. Fish and Wildlife Service
http://www.invasivespeciesinfo.gov/laws/main.shtml

PLANTS
Aquatic invasive plants are considered Noxious Weed Species by the state of California. They are listed in California Administrative Code Title 3, Section 4500, which states that their eradication, control, and containment is regulated by California Department of Food and Agriculture (DFA). Each species has been given a "pest rating" based on the economic risks it poses to the state. In addition, the California Department of Fish and Game Division 3, Chapter 3.5, Section 2300 restricts all species of the marine alga genus *Caulerpa*. Federally restricted invasive plants are listed in Noxious Weed Act P.L. 93-629. Plants on the federal list not specifically named in California legislation are automatically considered under temporary regulation by the DFA pending permanent state review.

California's list of Noxious Weeds
http://ccr.oal.ca.gov
Click on the following link: "Search for a Specific Regulatory Section"
Title: 3
Section: 4500

CDFA Weed List, sorted by Pest Ratings
http://www.cdfa.ca.gov/phpps/ipc/weedinfo/winfo_list-pestrating.htm

Federal Noxious Weed List (PDF)
http://www.invasivespeciesinfo.gov/laws/main.shtml

State and/or Federally Regulated Aquatic Invasive Animals

Scientific Name	Common Name	Group	Habitat	Regulated By
Mustelidae	All species except *Amblonyx cinerea* , Oriental small-clawed otter, *Aonyx capensis,* African clawless otter*, Pteronura brasiliensis,* giant otter and all species of genus *Lutra,* river otters.	Mammals	F	CA
Amiidae	bowfins	Fish	F	CA
Anguillidae	freshwater eels	Fish	F	CA
Aplodinotus grunniens	freshwater drum	Fish	F	CA
Astyanax fasciatus	banded tetra	Fish	F/B	CA
Belonesox belizanus	pike killifish	Fish	F	CA
Carcharinidae	freshwater sharks	Fish	F	CA, ?
Cetopsidae	whalelike catfishes	Fish	F	CA
Channidae	snakeheads	Fish	F	CA, US
Clariidae	airbreathing and labyrinth catfishes	Fish	F	US
Ctenopharyngodon idella	grass carp	Fish	F	CA
Cyprinodon variegatus	sheepshead minnow	Fish	F/B	CA
Dinotopterus	labyrinth catfishes	Fish	F	CA
Dorosoma cepedianum	gizzard shad	Fish	F	CA
Esocidae	pikes	Fish	F	CA
Glyphis	freshwater carcharhinid sharks	Fish	F	CA
Heterobranchus	labyrinth catfishes	Fish	F	CA
Heteropneustidae	airsac catfishes	Fish	F	CA
Hoplias malabaricus	tiger fish	Fish	F/B	CA
Hypophthalmichthys molitrix	silver carp	Fish	F	CA
Hypophthalmichthys nobilis	bighead carp	Fish	F	CA
Ictiobus	buffalo suckers	Fish	F/M	CA
Lepisosteidae	gars	Fish	F	CA
Leuciscus idus	Ide	Fish	F	CA
Morone americana	white perch	Fish	F	CA
Morone chrysops	white bass	Fish	F	CA
Parachanna africana	Niger or African snakehead	Fish	F	CA, US
Parachanna insignis	Congo, square-spotted African or light African snakehead	Fish	F	CA, US
Parachanna obscura	dark African, dusky, or square-spotted snakehead	Fish	F	CA, US
Perca flavescens	yellow perch	Fish	F	CA
Potamotrygoninae	river stingrays-all species of this genus	Fish	F/M	CA
Petromyzontidae	lampreys--all nonnative species	Fish	F/M	CA
Salmo salar	Atlantic salmon-restricted in the Smith River watershed	Fish	F/M	CA
Salmonidae	live or dead uneviscerated salmonid fish, live fertilized eggs, or gametes of salmonids are prohibited unless accompanied by a certification that the ensures they are free of *Onocorhynchus masou* virus and the viruses causing viral hemorrhagic septicemia and infectious hematopoietic necrosis, and meet the conditions in 50 CFR 16.13	Fish	F/M	US

State and/or Federally Regulated Aquatic Invasive Animals

Scientific Name	Common Name	Group	Habitat	Regulated By
Serrasalmus	piranhas (including invalid genera Serrasalmo, Pygocentrus, Taddyella, Rooseveltiella, and Pygopristis	Fish	F	CA
Stizostedion vitreum	walleye	Fish	F	CA
Tilapia aurea	blue tilapia	Fish	F/M/B	CA
Tilapia nilotica	Nile tilapia	Fish	F/M/B	CA
Tilapia sparrmani	banded tilapia	Fish	F/M/B	CA
Tilapia zilli	redbelly tilapia,except permits may be issued to a person or agency for importation, transportation, or possession in the counties of San Bernardino, Los Angeles, Orange, Riverside, San Diego, and Imperial	Fish	F/M/B	CA
Trichomycteridae	parasitic catfishes	Fish	F	CA
Ambystoma	mole salamanders	Amphibian	F	CA
Bufo marinus	cane toad or giant toad	Amphibian	F/M	CA
Bufo paracnemis	Cururu toad	Amphibian	F/M	CA
Xenopus	African clawed frog	Amphibian	F	CA
Alligatoridae	alligators	Reptile	F/M	CA
Chelydridae	snapping turtles	Reptile	F	CA
Crocodylidae	crocodiles, caimans	Reptile	F/M	CA
Gavialidae	gavials	Reptile	F/M	CA
Cambaridae	crayfish - all species except *Procambarus clarkii* and *Orconectes virilis*	Invertebrate	F/M	CA, US
Eriocheir	mitten crabs	Invertebrate	F/M	CA, US
Dreissena	zebra and quagga mussels	Invertebrate	F	CA, US *
Geukensia demissa	ribbed mussel	Invertebrate	M	CA, US
Mytilus galloprovincialis	Mediterranean mussel	Invertebrate	M	CA, US
Pomacea canaliculata	channeled applesnail	Invertebrate	M	CA
Potamopyrgus antipodarum	New Zealand mudsnail	Invertebrate	M	CA
Transgenic Aquatic Animals	Freshwater and marine fishes, invertebrates, crustaceans, mollusks, amphibians and reptiles		F/M	CA

Key

B Brackish
F Freshwater
M Marine
CA CDFG Restricted Species, Title 14, Section 671
US USFW Lacey Act 50 CFR 16.11-16.15

* Dreissena polymorpha only

State and/or Federally Regulated Aquatic Invasive Plants

Scientific Name	Common Name	Habitat	Applicable Regulations/Pest Rating
Alternanthera philoxeroides	alligatorweed	FW	A
Arundo donax	giant reed	W/U/R	US
Azolla pinnata	mosquito fern, water velvet	FW	US
Cabomba caroliniana	fanwort	FW	US
Caulerpa taxifolia	Caulerpa	MA	US, CDFG
Caulerpa cupressoides	Caulerpa	MA	CDFG
Caulerpa mexicana	Caulerpa	MA	CDFG
Caulerpa sertulariodes	Caulerpa	MA	CDFG
Caulerpa floridana	Caulerpa	MA	CDFG
Caulerpa ashmeadii	Caulerpa	MA	CDFG
Caulerpa racemosa	Caulerpa	MA	CDFG
Caulerpa verticillata	Caulerpa	MA	CDFG
Caulerpa scapelliformis	Caulerpa	MA	CDFG
Eichhornia azurea	anchored water hyacinth	FW	US
Hydrilla verticillata	hydrilla	FW	US, A
Hygrophila polysperma	Miramar weed	FW	US
Ipomoea aquatica	Chinese water spinach	FW	US
Lagarosiphon major	oxygen weed	FW	US
Limnobium spongia	spongeplant	FW	US
Limnophila indica	ambulia	FW	US
Limnophila sessiliflora	ambulia	FW	US
Lythrum salicaria	purple loosestrife	W/U	B
Melaleuca quinquenervia	broadleaf paper-bark tree	W	US
Monochoria hastata	monochoria	FW	US
Monochoria vaginalis	heartshape false pickerelweed	FW	US
Nymphaea mexicana	banana water lily	FW	B
Ottelia alismoides	duck lettuce	FW	US
Pistia stratiotes	water lettuce	FW	B
Polygonum amphibium	swamp smartweed	FW	C
Polygonum cuspidatum	Japanese knotweed	W/U/R	B
Sagittaria sagittifolia	arrowhead	FW	US
Salvinia auriculata	salvinia	FW	US, A
Salvinia biloba	salvinia	FW	US, A
Salvinia herzogii	herzog salvinia	FW	US, A
Salvinia molesta	giant salvinia	FW	US, A
Sparganium erectum	exotic bur-reed	FW	US
Tamarix chinensis	Chinese tamarisk	U/R	X
Tamarix gallica	French tamarisk	U/R	X
Tamarix parviflora	smallflower tamarisk	U/R	X
Tamarix ramosissima	salt cedar	U/R	X

Key for State and/or Federally Regulated Aquatic Invasive Plants

CDFG	Regulated by CDFG Division 3, Chapter 3.5, Section 2300
FW	Freshwater
MA	Marine algae
R	Riparian
SM	Saltmarsh
U	Upland
US	**Regulated by the Federal Noxious Weed Act, P.L. 93-629.** Note: All species on List 2, Federal Noxious Weed Regulation, are given an automatic pest rating of “Q” when evaluated in California. A "Q" is an organism requiring temporary A action pending determination of a permanent rating. The organism is suspected to be of economic importance but its status is uncertain because of incomplete identification or inadequate information. In the case of an established infestation, at the discretion of the Asst. Director for Plant Industry, the Dept. will conduct surveys and will convene the Division Pest Study Team to determine a permanent rating.
W	Wetland

California Department of Food and Agriculture Noxious Weeds, Title 3, Section 4500 Pest Ratings

A	An organism of known economic importance subject to enforced action involving eradication, containment, rejection, or other holding action at the state-county level. Quarantine interceptions to be rejected or treated at any point in the state.
B	An organism of known economic importance subject to eradication, containment, control or other holding action at the discretion of the commissioner. OR an organism of known economic importance subject to state holding action and eradication only when found in a nursery.
C	An organism subject to state endorsed holding action and eradication only when found in a nursery; action to retard spread outside of nurseries at the discretion of the commissioner; reject only when found in a cropseed for planting or at the discretion of the commissioner.